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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,968	11/10/2003	Chin-Lung Lin	NAUP0543USA	2967
27765 7590 03/19/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER CHACKO DAVIS, DABORAH	
			ART UNIT	PAPER NUMBER
			1756	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		03/19/2007	ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary

Application No.

10/605,968

Applicant(s)

LIN ET AL

Examiner

Daborah Chacko-Davis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The replacement drawings filed December 8, 2006, are objected to because it contains new matter. The replacement drawings include matter that was not in the original specification, claims and drawings, viz., reference numerals 111, and 113 of figure 4, and reference numerals 211, and 213 of figure 6. Appropriate correction is required.

Specification

2. The amendment filed December 8, 2006, is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: In paragraph [0022], "The first phase shift transparent region 104 and the second phase shift transparent region 106 share a common side 111. One end of the common side 111 is located at or on the periphery of the transparent main features 102. The first phase shift transparent region 104 has another side 112 adjacent to the common side 111. The second phase shift transparent region 106 has another side 113 adjacent to the common side 111. The sides 112 and 113 are located at or on the periphery of the transparent main feature 102." And in paragraph [0030], "The first phase shift transparent region 204 and the second phase shift transparent region 206 share a common side 211. One end of the common side 211 is located at or on the periphery of the transparent main features 202. The first phase shift transparent region 204 has

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another side 212 adjacent to the common side 211. The second phase shift transparent region 206 has another side 213 adjacent to the common side 211. The sides 212 and 213 are located at or on the periphery of the transparent main feature 202.”

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-20, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, and 13, recite “any two contiguous first phase shift transparent region and second phase shift transparent region share a common side with one end located at or on the periphery of the transparent main features, and both of the any two contiguous first phase shift transparent region and second phase shift transparent region each have another side adjacent to the common side and located at or on the periphery of the one of the transparent main feature”. The original specification, in the abstract, and in paragraph nos. [0013], and [0022], discloses “each of the transparent main features 102 is surrounded by the first phase shift transparent regions 104 and the second phase shift transparent regions 106

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interlaced contiguously along a periphery of the transparent main feature 102". The original specification does not disclose or suggest a contiguous first phase shift transparent region and a second phase shift transparent region that share a common side. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 4, 7-20, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,388,736 (Smith et al., hereinafter referred to as Smith) in view of U. S. Patent Application Publication No. 2004/0229131 (Lin et al., hereinafter referred to as Lin '131).

Smith, in col 3, lines 54-67, in col 4, lines 1-20, and lines 53-67, in col 6, lines 35-67, in col 7, lines 1-24, in col 8, lines 5-27, in col 9, lines 42-56, in col 10, lines 38-41, in col 12, lines 19-26, discloses an imaging method (lithographic process) of

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forming a resist pattern (relief pattern) on a substrate using a phase shifting mask, wherein the mask includes a plurality of first and second phase shifting transparent regions surrounding a feature in a continuous manner (spacing between patterns are small), opaque regions (0% transmission regions, adjacent and/or not adjacent the feature patterns, random features of 0% and 100% transmission of varying thicknesses), and the phase shift transparent regions are placed close to each other allowing phase shifting of 0° and 180° relative to each other (phase shift regions and the pattern feature), illuminating the mask to form the corresponding patterns on the substrate (resist pattern on the substrate). Smith, in col 4, lines 1-20, discloses that the boundaries of the phase shift features are placed very close each other such that the destructive image intensities does not resolve but produce a dark region i.e., the at least one end of each of the phase shifting regions are positioned at an edge portion of the main feature (transparent main feature) (claims 1, 8-9, 10-12, 13, 17-20). Smith, in col 10, lines 66-67, in col 11, lines 1-5, discloses a silicon dioxide substrate (claims 2, and 14). Smith, in col 1, lines 13-28, discloses that the pattern formed is a circuit pattern (claims 4, and 15). Smith, in col 6, lines 41-45, discloses that the phase shifting mask is a chromeless phase shifting mask (claims 7, and 16).

The difference between the claims and Smith is that Smith does not disclose that the first and second phase shifting regions share a common side wherein the common side is adjacent to the end (another side adjacent to the common side) of each of the phase shifting features that is located at the periphery of the main feature.

Lin '131, in [0011], discloses that the first and second phase shifting transparent regions (a plurality of sub-resolution assistant features) are interlaced and positioned such that one end of each of the sub-resolution assistant features are positioned at the edge of the main pattern (feature), and said end of the phase shifting features (sub-resolution assistant features) is adjacent to the side that is shared by the subresolution assistant features as a common side (see figures 1A, and 1B), i.e., the sub-resolution features share a common side.

Therefore, it would be obvious to a skilled artisan to modify Smith by employing the arrangement of a plurality of sub-resolution features around the main feature as suggested by Lin '131 because Lin'131, in paragraph nos. [0010], and [0011], discloses that employing the claimed arrangement of phase shifting sub-resolution features around the main feature results in a photomask that permits feature miniaturization without compromising the uniformity of critical dimensions.

8. Claims 3, 5-6, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,388,736 (Smith et al., hereinafter referred to as Smith) in view of U. S. Patent Application Publication No. 2004/0229131 (Lin et al., hereinafter referred to as Lin '131) as applied to claims 1-2, 4, 7-20, and further in view of U. S. Patent Application Publication No. 2004/0013948 (Lin et al., herein after referred to as Lin).

Smith in view of Lin '131 is discussed in paragraph no. 7.

Smith in col, 1, lines 13-24, and in col 3, lines 65-67, discloses an imaging

method of forming circuit patterns (includes metal lines patterns) on a photosensitive material coated substrate (claim 6).

The difference between the claims and Smith in view of Lin '131 is that Smith in view of Lin '131 does not disclose that the photosensitive layer is a positive photoresist layer (claim 3). Smith in view of Lin'131 does not disclose that the photosensitive layer is a negative photoresist layer (claim 5).

Lin, in [0002], and [0024], discloses a photolithographical method of performing exposure on a positive or a negative photoresist (photosensitive material) coated wafer so as to transfer equal or complementary patterns of the mask to the photosensitive material (claims 3, and 5).

Therefore, it would be obvious to a skilled artisan to modify Smith in view of Lin '131 by employing a positive or a negative photoresist material as the photosensitive material as suggested by Lin because Smith, in col 10, lines 66-67, in col 11, lines 1-5, discloses that the illumination process can be performed on a photosensitive material or resist material via a mask pattern, wherein the resist material enables pattern delineation and creation of masking apertures.

Response to Arguments

9. Applicant's arguments with respect to claims 1, and 13, filed December 8, 2006, have been considered but are moot in view of the new ground(s) of rejection. See paragraph no. 7.

A) Applicants argue that Smith et al., does not teach a plurality of first phase shift transparent regions and a plurality of second phase shift transparent regions.

Smith et al., in col 4, lines 3-10, discloses that the phase shift features are formed around the main feature i.e., more than one phase shift feature is formed. Also, Lin 131, in the abstract, and in [0011], teaches forming plurality of phase shifting features around the main feature.

B) Applicants argue that Smith et al does not teach claim 1, and 13 and that two phase shifting boundaries or edges that are in close proximity cannot be broadly read as having ends that are substantially touching each other and the main features.

Smith et al., teaches claims 1, and 13 as discussed in paragraph no. 7. Smith et al., teaches that the end of the first and second phase shifting features are positioned at the edge of the main feature. However, Lin '131 is relied upon to disclose that the first and second phase shifting features share a common side with each other. Additionally, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., two transparent phase shifting features that are substantially touching each other and the main features) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

March 8, 2007.

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700